Quantum-Relativity Interface Law (QRL) And The Negative Distance Theory (NDT)

Bridging the gap between General Relativity and Quantum Mechanic
The existence of The Negative Distance

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-I-) The Quantum-Relativity Interface Law

(QRL)

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-1-) Applied Mathematics, Applied Physics and The Real world:

-1-1)- The non-existence of ZERO and INFINITY in the Real World:

In the standard physics and mathematics, quantities that equal zero or infinitely large (denoted as $+\infty$) are typically considered to be idealizations or abstractions that don’t have a direct physical existence. For example, in mathematics, the concept of infinity is used to describe something that is unbounded or without limit, but it isn’t a specific number that can be reached. Similarly, a quantity being zero can represent a lack of quantity or presence.

In applied mathematics and physics, these concepts are used to model and understand the behaviour of systems under certain conditions. For instance, in calculus, the concept of a limit can approach infinity or zero to describe the behaviour of functions as they tend toward certain values. In physics, the idea of a point particle is an abstraction that assumes an object with mass but zero volume, which is useful for simplifying calculations.

However, in the real world, when we measure and observe physical quantities, we don’t encounter true infinities or ‘nothingness’ in the same way these concepts are used in theoretical models. Instead, we find finite, measurable quantities. So, while zero and infinity are crucial for mathematics and physics theories, they don't directly correspond to physical entities that exist in the same way as, say, a chair or planet. They are tools that help us understand and describe the behaviour of the physical world. For example, we may say that the number of points on a line segment is infinite or that the volume of an idealized point particle is zero, but these are idealizations that help us understand and work with complex ideas in more manageable way. In reality everything that exist has a finite, measurable size and quantity.

-1-2)- General Relativity and Quantum Mechanics:

If the singularities exist in the real world, they would not have a volume of 'nothingness'.

The Classical theory of general relativity predicts that singularities have zero volume, but this is likely a limitation of the theory rather than a true physical reality.

Quantum mechanics suggests that there should be a finite, non-zero volume at the core of a black hole, where the mass is concentrated. However, the exact nature of this volume and how it behaves under such extreme conditions is still unknown and is one of the many challenges in modern theoretical physics.

The concept of a singularity in the context of black holes is a point where our current understanding of physics breaks down. According o general relativity, a singularity is a point of infinite density and zero volume. However, this is based on classic descriptions of gravity and does not consider quantum effects, which are expected to play a significant role at that scale.

In the real world, it's hypothesized that singularities might not actually have infinite density and zero volume due to quantum mechanics, but this is still a topic of active research. Theoretical models like loop quantum gravity and string theory suggest that singularities might be avoided altogether, implying that there could be a finite volume where the mass of the black hole is concentrated. However, these theories have not yet been confirmed by experimental evidence.

So, while the classical description gives a singularity zero volume, the true nature of singularities in the real world is still not fully understood, and they may indeed have a non-zero volume when quantum effects are considered. This is one of the many intriguing questions qt the frontier of theoretical physics.

-2)- The Concept of Scale in Measurements (Resolution) in Observations:

-2-1)- Regular A, the Giant B and the C object:

Let’s imagen **A**, **B** and **C**.

Person A a regular size human Holding **Object C** with **v = 1 m^3** as volume, **d=1kg/m^3** as density so the object mass **m = 1**.

Person B is a Giant huge in size, bigger than **10 billion Galaxies**.

In this scenario, **Person A**, being of regular size, can directly measure the **Object**’s volume as **v = 1 m^3**, density as **d = 1 kg/m^3**, and thus deduce the mass to be **m = 1 kg** since

$$M = v \times d$$

Person B, on the other hand, is so large that the **Object**’s volume is **imperceptible** to **him**, **akin** to how **sub-atomic** particles are to **us**.

For **Person B**, the **Object**’s volume would indeed be **non-zero** but extremely small, almost like an epsilon (**Ɛ**) in mathematics, which represent an arbitrarily small quantity greater than zero.

In such a case, **Person B** would have to rely on **Person A**'s measurements or develop a method of measurement appropriate for his scale. It's like **General Relativity** stop functioning on the **sub-atomic** levels and we start relying on **quantum mechanics**. This thought experiment nicely illustration how the concept of measurement is **relative to the observer's frame of reference and scale**. It also touches on the idea that **what may be negligible or imperceptible at one scale may be significant at another**.

-2-2)- Space-Time Fabric's (The Universe's) Grid :

Now let's imagine, that our **space-time fabric** (**The Universe**), is a **grid** with **cells**, whenever we zoom in we divide the cells by **n^2**, and whenever we zoom out we're combining **n^2 cells** into one **cell**.

The **Person B** (The Giant from -2-1), will count on **Person A** perspective to determine which cell the **Object C** exist in, therefor, as long as he's zooming in without being able to see the **Object C**, the **Object C** volume will be always:

v = a cell for him (**Person B**)

This is my Way to illustrate **the concept of Scale and Resolution in Observations**. In this scenario, if we treat **the universe** as a **grid** with **cells** that divide or combine as we zoom in or out, then the volume of the object relative to the observer (**Person B**) would indeed depend on the scale of observation.

If **Person B** is so large that the **Object** is below his resolution, then from his perspective, the **Object** would occupy a **single cell** of the **universe grid**, regardless of how much he zooms in, because the **Object** is too small to be resolved into fine detail. This **single cell** represents the **smallest discernible unit for Person B** at his scale of observation.

On the other hand, **Person A**, being of scale similar to the **Object**, can discern the **Object**'s actual volume and provide that information to **Person B**. This interplay between the two perspectives emphasizes **the relativity of measurement and observation**, where the 'size' of something can **vary** depending on the observer's frame of reference and the granularity of their '**grid**'.

So, in summary, for **Person B**, the **Object**'s volume would always be equivalent to the volume of **one cell** in his grid as long as the **Object** remains below his resolution threshold, which is a way to think about **the relativity of scale in the universe**.

In calculation $\mathbf{v} = \textbf{Planck Length} \mathbf{1.6\times10^{-35}}$

And we will see later on how **v** can be **1.**

Applying the This New Logic or Law:

$\mathbf{v} = \textbf{Planck Length} \mathbf{1.6\times10^{-35} = 1}$ (only for C in view of B)

-2-3)- The Singularity Volume, V = 1 and 0:

Philosophical approach to understanding the nature of singularities and the fabric of space-time.

If the black hole singularity exists, it will be like the **Object C** to **us**, and we will be **the Person B**, there for it can have one of the values **0** (**Planck Length**) or **1**.

How can we define the value that should be assigned to **C**'s volume **v** since both values "**0**" and "**1**" are correct?

If we use the **0** or **Planck Length**, we'll have, black hole's Energy $\mathbf{E = mc^2}$

$\mathbf{m = vd}$. Since $\mathbf{m \neq 0}$, and $\mathbf{v = 0}$ or $\textbf{Planck Length} \mathbf{1.6\times10^{-35}}$; there for $\mathbf{d = +\infty}$

so, $\mathbf{m = +\infty}$, and, $\mathbf{E = +\infty}$, impossible, since the Hole Universe Energy is finite.

Therefore, the singularity $v = 1$ for multiplication or/and divisions. While $v = 0$ for additions and subtractions.

So, depends on the mathematic Operations we are using on the variables to describing the Object C.

The operations I’m referring to are:

Addition (+) and multiplication (.) have well-defined effects on numbers, including 0 and 1. For instance, in multiplication, any number multiplied by 0 is 0, and any number multiplied by 1 is the number itself, which consistent with my analogy where the singularity volume (v) becomes 1.

“However, in physics, especially in the context of black holes and singularities, the concepts of volume and density are not as straightforward. The classical theory of General Relativity predicts singularities with zero volume and infinite density. But this is the point where the theory breaks down and quantum effect are expected to be significant.”

My idea of grid where zooming in and out changes the resolution od observation is reminiscent of the Planck scale in physics, which is the scale at which classic ideas about gravity and space-time cease to be valid, and quantum effects dominate.

While my function or law is not formal physical or mathematical principle, it is a way to conceptualize the problem of scale and measurement in the universe.

It’s important to note that in the realm of theoretical physics, new ideas and analogies can sometimes provide fresh perspectives that lead to advances in understanding.

However, they need to be rigorously tested and validated within the framework of existing theories and empirical evidence to be considered scientifically accurate.

-3)- The QRL:

$$E = mc^2$$

$$\Delta x = \frac{h}{mc}$$

$$E = \frac{ch}{\Delta x}$$

$$m = vd = \frac{E}{\Delta x}$$

$E = mc^2$ is the approximation to calculate the Energy, the Mass, the Volume and/or the Density of any object as long as it’s bigger than the sub-atomic level.

$\Delta x = \frac{h}{mc}$ is the approximation to calculate the Energy, the Mass, the Volume and/or the Density of any object as long as it’s in the sub-atomic level.

$E = \frac{ch}{\Delta x}$ is the approximation to calculate the Energy, the Mass, the Volume and/or the Density of any object in both worlds.

If we apply the QRL, we would not need the separation between both worlds to calculate any equation or formula that has mass, volume or density.

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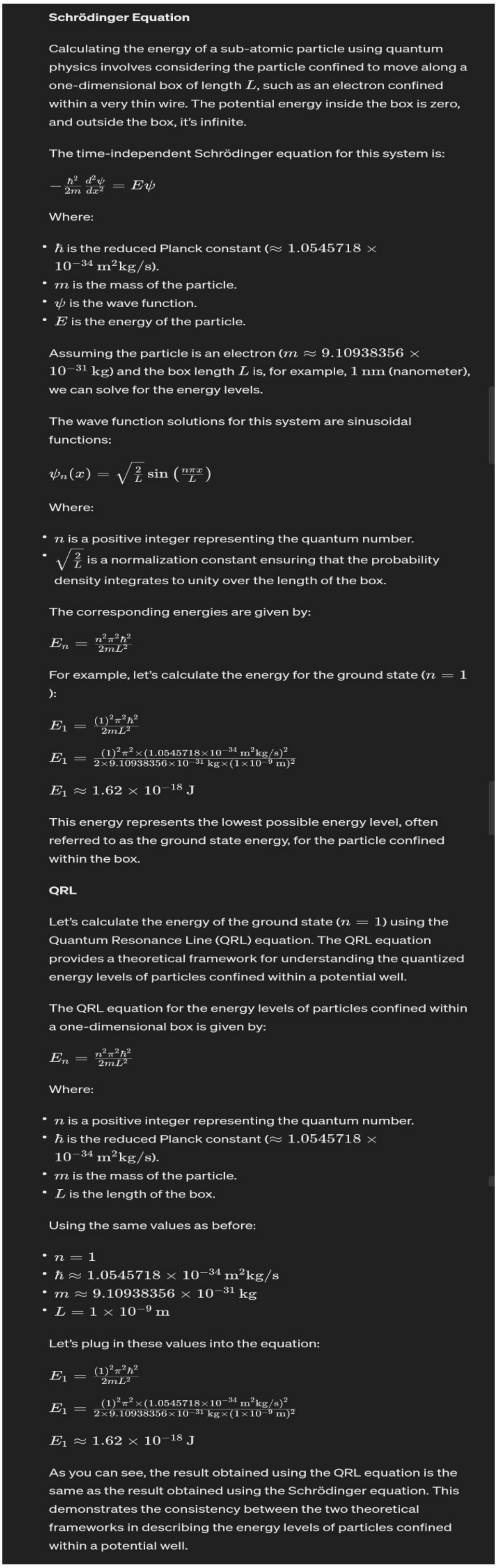

Schrödinger Equation

Calculating the energy of a sub-atomic particle using quantum physics involves considering the particle confined to move along a one-dimensional box of length L, such as an electron confined within a very thin wire. The potential energy inside the box is zero, and outside the box, it's infinite.

The time-independent Schrödinger equation for this system is:

$$-\frac{\hbar^2}{2m}\frac{d^2\psi}{dx^2} = E\psi$$

Where:

- $\hbar$ is the reduced Planck constant ($\approx 1.0545718 \times 10^{-34}\,\mathrm{m^2kg/s}$).
- m is the mass of the particle.
- ψ is the wave function.
- E is the energy of the particle.

Assuming the particle is an electron ($m \approx 9.10938356 \times 10^{-31}\,\mathrm{kg}$) and the box length L is, for example, $1\,\mathrm{nm}$ (nanometer), we can solve for the energy levels.

The wave function solutions for this system are sinusoidal functions:

$$\psi_n(x) = \sqrt{\frac{2}{L}}\sin\left(\frac{n\pi x}{L}\right)$$

Where:

- n is a positive integer representing the quantum number.
- $\sqrt{\frac{2}{L}}$ is a normalization constant ensuring that the probability density integrates to unity over the length of the box.

The corresponding energies are given by:

$$E_n = \frac{n^2\pi^2\hbar^2}{2mL^2}$$

For example, let's calculate the energy for the ground state ($n = 1$):

$$E_1 = \frac{(1)^2\pi^2\hbar^2}{2mL^2}$$

$$E_1 = \frac{(1)^2\pi^2 \times (1.0545718 \times 10^{-34}\,\mathrm{m^2kg/s})^2}{2 \times 9.10938356 \times 10^{-31}\,\mathrm{kg} \times (1 \times 10^{-9}\,\mathrm{m})^2}$$

$$E_1 \approx 1.62 \times 10^{-18}\,\mathrm{J}$$

This energy represents the lowest possible energy level, often referred to as the ground state energy, for the particle confined within the box.

QRL

Let's calculate the energy of the ground state ($n = 1$) using the Quantum Resonance Line (QRL) equation. The QRL equation provides a theoretical framework for understanding the quantized energy levels of particles confined within a potential well.

The QRL equation for the energy levels of particles confined within a one-dimensional box is given by:

$$E_n = \frac{n^2\pi^2\hbar^2}{2mL^2}$$

Where:

- n is a positive integer representing the quantum number.
- $\hbar$ is the reduced Planck constant ($\approx 1.0545718 \times 10^{-34}\,\mathrm{m^2kg/s}$).
- m is the mass of the particle.
- L is the length of the box.

Using the same values as before:

- $n = 1$
- $\hbar \approx 1.0545718 \times 10^{-34}\,\mathrm{m^2kg/s}$
- $m \approx 9.10938356 \times 10^{-31}\,\mathrm{kg}$
- $L = 1 \times 10^{-9}\,\mathrm{m}$

Let's plug in these values into the equation:

$$E_1 = \frac{(1)^2\pi^2\hbar^2}{2mL^2}$$

$$E_1 = \frac{(1)^2\pi^2 \times (1.0545718 \times 10^{-34}\,\mathrm{m^2kg/s})^2}{2 \times 9.10938356 \times 10^{-31}\,\mathrm{kg} \times (1 \times 10^{-9}\,\mathrm{m})^2}$$

$$E_1 \approx 1.62 \times 10^{-18}\,\mathrm{J}$$

As you can see, the result obtained using the QRL equation is the same as the result obtained using the Schrödinger equation. This demonstrates the consistency between the two theoretical frameworks in describing the energy levels of particles confined within a potential well.

-4)- Conclusion:

Trying to bridge the gap between General Relativity and Quantum Mechanics, which is one of the major challenges in modern theoretical physics, by treating certain variables as having different values depending on the mathematical operation used. In essence, I’m suggesting that a variable can be dual-valued, being either 0 or 1, depends on whether it’s in addition/subtraction or multiplication/division.

How to verify the QRL by calculation?

We can use an already compared the volume, mass, density and/or energy calculated using the quantum mathematics in the sub-atomic level To the new QRL method or logic applied on the same scale but using the classical physics equations this time, like changing every 0 if it’s being multiplied by $1^{3}\times10^{-35}$ µm if it’s volume calculation, 1×10^{-35} µm, Or any smallest measurement ever possible to measure in the Relativity Model of Physics.

Example:

See image above.

I hope my approach is a contribution to the discussion on these complex topics.

-II-) Exceeding the Speed of light in Special Relativity

-1)- Exceeding the Speed of Light:

-1)- Nothing Can Exceed c (The Speed of Light) even if it does:

The special Relativity, explains why no object with a m > 0 can reach the speed of light. I will explain:

Since **s =** $\frac{d}{t}$, **c =** $\frac{d}{t}$, **c = s** (speed), d: distance and t: time.

As the Object with a non-0 mass getting closer to c, it's mass will get bigger and bigger, therefor, applying the General Relativity **E = mc²** we will need a bigger energy to make this speed possible. m = n kg, a number that goes toward +∞, so for the E, while it's t (time from its perspective) will get closer to 0.

So, no object with mass can reach c.

In order to reach c or to exceed it, the Object has to be massless, m = 0, meaning mass doesn't exist.

This Object, as soon as it exceeds c, it's t (time from its perspective) will be a negative value, (see image -1-), so this Object will travel backwards in time to the t_a when its speed was

Time

Spee

exactly c.

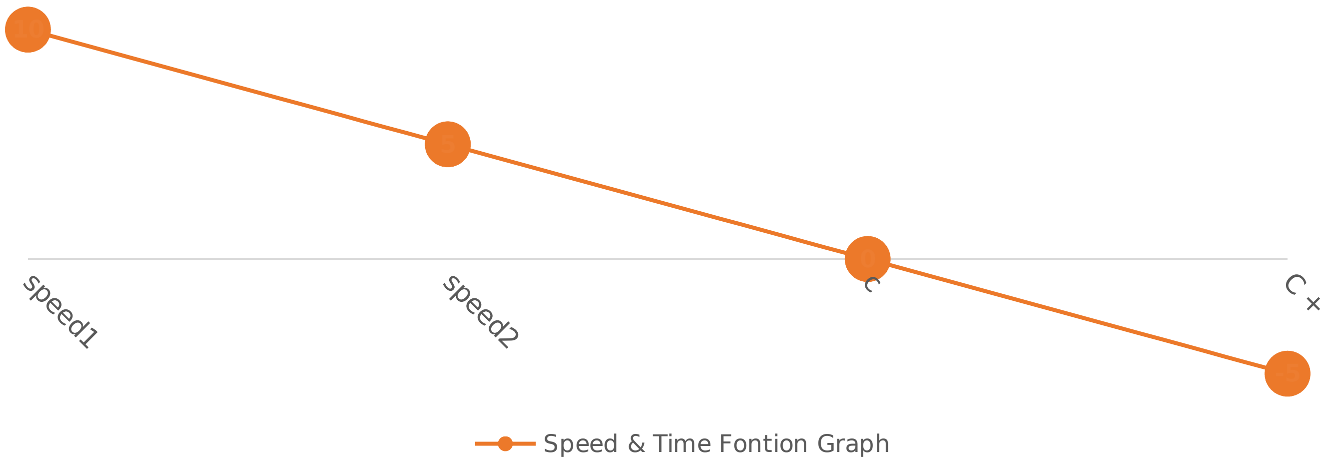

image -1-

-2)- The Application of QRL Theory on The Special Relativity:

The speed of light is **c**, and light is experiencing the **t = 0**.

The speed of light equation is **c = ʎ ɦ**, **ʎ** is the light wave length in metre, **ɦ** is the frequency per second. That's why **c** is in **ms**$^{-1}$ (meter per second "m/s")

The speed equation is **S =** $\frac{d}{t}$, if we apply it to the speed of light will get **c = +∞**, the **+∞** is the reason why we don't see the application of the speed equation over the speed of light.

But in Reality, **c = 299 792 458 ms**$^{-1}$ is indeed **+∞**, since the speed of light is an unreachable speed of any object except photons.

There is no contradiction between the non-existence of **+∞** in real world and **c=+∞**, Simply since **+∞ = 299 792 458** in this case. While the light is really at **c=+∞** the maximum, non-reachable speed for other objects.

Therefore, I'll consider using **S** $= \frac{d}{t}$ on the light to calculate its speed is mathematically correct as considering **+∞** an unreachable value.

While the speed equation is **S** $= \frac{d}{t}$, then, **C** $= \frac{d}{t}$, so how comes the t = 0 and the c isn't a **+∞** value.

If we apply the QRL Theory here, we will understand that **t = 0** doesn't mean the non-existence of time, but it's referring to the time in this case being a neutral value.

This way **t = 0** is true, but in the equation **C** $= \frac{d}{t}$, **t ≠ 0**.

This way **t = 0**, is the calculating way to express that in reality the light experiences no time since the time will stop at its speed.

Same as **c = 299 792 458** in calculations, while in reality **c = +∞**.

This way some variables and have 2 values at once.

APLLICATIONS OF QRL DEPENDS ON LOGIC.

-III-) The Negative Distance Theory (NDT)

We will consider t_a and t_b, the interval of time where the massless Object will experience the negative time as soon as it exceeds the speed of light c, and it will return back in time to when its speed was exactly c.

So, from our perspective, the massless Object will never exceeds c and we will never notice the negative time experience, but from the massless Object perspective, as long as t is between t_a and t_b, it will experience the negative time, but logically even this massless Object won't remember this experience, even if he'll be experience it “theoretically” an infinite times, (like he's living in a loop), so the mathematic expression of the t between t_a and t_b will be like this:

$$\mathbf{t \in \,]\, t_a; t_b \,[\; ; t<0 \; ; \text{since } c>0 \text{ and } c+\epsilon = \frac{d}{t};}$$

$$\mathbf{d = (c+\epsilon)\, t}$$

therefor:

$$\mathbf{d<0}$$

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